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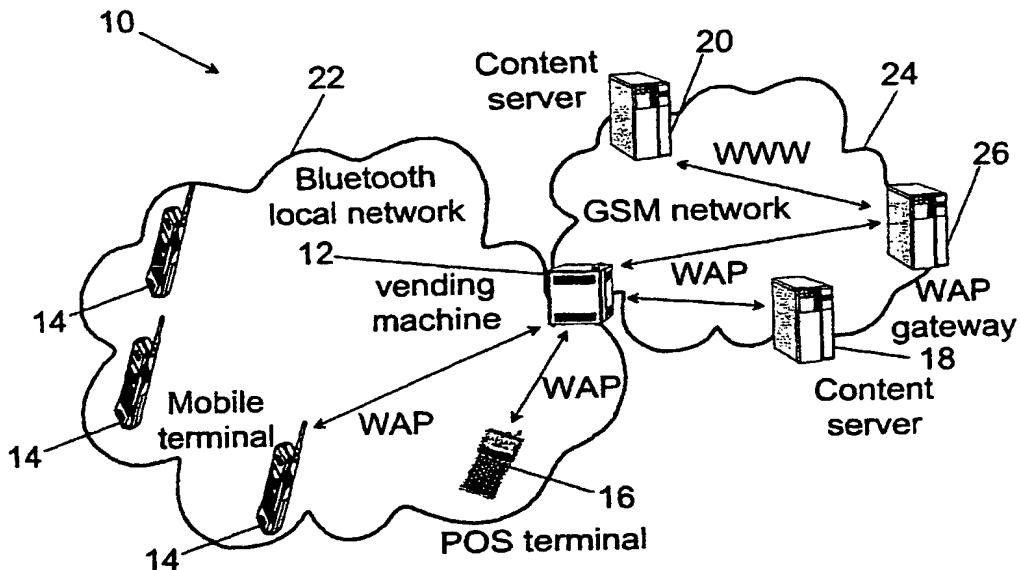
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(72) Inventor; and (75) Inventor/Applicant (for US only): CASAIS, Eduardo [CH/FI]; Visamäki 5 G 60, FIN-02130 Espoo (FI). Published: — With international search report.

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(54) Title: SUPPLY OF ELECTRONIC DATA



(57) **Abstract:** A system (10) for supplying data in electronic form comprises mobile telephones (14) and a wireless vending machine (12). The wireless vending machine (12) is able to obtain electronic data from data servers (18, 20) by communicating over a cellular telephone network. The wireless vending machine (12) is able to send the electronic data to the mobile terminals (14) over a Bluetooth local network (24). A user of a mobile telephone (14) is able to interrogate the wireless vending machine (12) to determine the electronic data it contains and to request that at least part of the electronic data be transmitted to the mobile telephone (14).

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SUPPLY OF ELECTRONIC DATA

The invention relates to supply of electronic data and is particularly, but not exclusively, related to supply of electronic content by wireless transmission to 5 mobile terminals.

Vending machines are known in which electronic data can be written on to a data carrier which is then supplied to a customer. US 5 633 839 discloses a vending machine which writes a customer's selection of individual pieces of music onto a 10 compact disc. The user can pay for the compact disc by using a credit card which is inserted into the vending machine.

A disadvantage of this type of approach is that it is necessary for the customer to get physically close to the vending machine in order to make a selection of 15 electronic data (for example by using a keyboard built in the vending machine), to pay for the selection (for example by inserting coins or a credit card) and to retrieve the selection of electronic data on a medium for carrying electronic data (for example a CD-ROM).

20 It has also been proposed to use calls from mobile telephones as the basis of payment for goods and services. For example, rather than using coins to pay for a soft drink from a vending machine, a user of the mobile telephone dials a particular telephone number and the cost of the soft drink is charged to his telephone bill.

25 It is also known to download ringing tones from a cellular network for use in mobile telephones.

According to a first aspect of the invention there is provided a system for supplying data in electronic form comprising a mobile terminal, a supplying terminal, a 30 wireless network and a wireless connection, the supplying terminal being able to obtain electronic data from at least one data server by communication over the wireless network, the supplying terminal being able to supply at least part of the

electronic data to the mobile terminal by communication over the wireless connection.

Preferably the supplying terminal is a vending machine which supplies electronic

5 data in exchange for a monetary payment.

Preferably there is a plurality of data servers to supply electronic data to the supplying terminal. Preferably there is a plurality of supplying terminals.

10 Preferably the networks use a common communication protocol. Preferably the supplying terminal acts as a proxy between the mobile terminal and the data server. Alternatively, it acts as a gateway.

15 In a preferred embodiment, the mobile terminal is a mobile telephone. However, the invention is not limited to devices which are used for communicating, for example by telephony, but may apply to other devices which are able to receive data or content. These may be consumer devices with electronic memory which can receive electronic data when a user of the device requests it. For example, the electronic data may be electronic games for game playing devices, electronic 20 video recordings for portable video players, electronic recordings of music or other audio-media for portable audio players, digital maps or digital books for personal digital assistants and smart telephones (such as the Nokia 9110 Communicator) and directories and telephone books for mobile telephones. All that is required is for the mobile terminal to use a communication method which is compatible with 25 that used by the supplying terminal.

30 Preferably the mobile terminal and the supplying terminal communicate by the Wireless Application Protocol (WAP). If WAP is used to communicate, many consumer terminals including mobile telephones, personal digital assistants, smart telephones, game playing devices and mobile audio and/or video playing devices, if properly configured and WAP-enabled, should be able to download electronic data from the supplying terminal.

According to a second aspect of the invention there is provided a method for supplying data in electronic form comprising the steps of:

- providing a mobile terminal;
- providing a supplying terminal;
- 5 providing one or more data servers;
- providing a wireless network for enabling data transfer between the supplying terminal and data servers;
- providing a wireless connection for enabling data transfer between the mobile terminal and at the supplying terminal;
- 10 the supplying terminal obtaining data from at least one data server by communication over the wireless network; and
- the supplying terminal transmitting at least part of the data to the mobile terminal over the wireless connection.

15 Preferably the data transmitted to the mobile terminal from the supplying terminal is only part of the data transmitted to the supplying terminal by the data server or data servers. A user of the mobile terminal may determine the part which is transmitted. Alternatively this may be determined automatically.

20 According to a third aspect of the invention there is provided a supplying terminal for supplying data in electronic form comprising first wireless communication means for receiving data from at least one data server over a wireless network and second wireless communication means for sending at least part of the data to a mobile terminal over a wireless connection.

25 Preferably the wireless network and the wireless connection operate using different carrier frequencies. Preferably the wireless network uses a carrier frequency which is lower than the carrier frequency of the wireless connection. Preferably the wireless network is a cellular network using a carrier frequency in

30 the range 0.45 to 2 GHz. Most preferably it uses a carrier frequency of 0.9 GHz or 1.8 GHz. Preferably the wireless connection is a local network (forming a pico-cell) using a carrier frequency in the region of 2.4 GHz. The wireless connection may be provided by a local network according to Bluetooth, according to IEEE 802.11,

or according to any other Low Power Radio Frequency (LPRF) communication technique. However, the wireless connection may be provided by a cellular network.

- 5 The wireless network may be a cellular network such as GSM. The supplying terminal may request the data by WAP. The wireless network may obtain the data from a second network, such as the Internet, via a gateway. The second network may be a wired network. If the second network is the Internet, the gateway may request the data by using HyperText Transfer Protocol (HTTP) and HyperText
- 10 Mark-up Language (HTML). Alternatively, the data may be hosted directly on the data server, in which case the need to have access to the second network can be avoided.

According to a fourth aspect of the invention there is provided a mobile terminal which is able to interrogate, over a local network, a supplying terminal according to the third aspect of the invention in order to determine the nature of electronic data stored in the supplying terminal, the mobile terminal having a display on which can be presented information relating to the electronic data, requesting means to request the supplying terminal to transmit at least some of the electronic data, receiving means which can receive the transmitted electronic data, and storage means which can store transmitted electronic data.

In a system according to the invention, customers do not need to browse the Internet or access explicitly a variety of central locations to download electronic data; they may have access to the electronic data simply by entering the vicinity of a supplying terminal.

The invention overcomes problems with scalability which would exist if a central server were to be used for interactive downloading of electronic content, such as a WWW-site or a video-on-demand server. The plurality of supplying terminals is able to spread real-time simultaneous accesses by a large number of customers (perhaps hundreds of thousands) among a number of supplying terminals. Servers providing electronic data to these supplying terminals, and obtaining information

from them, can carry out these tasks at convenient times in batch mode, for example during the night. Furthermore, the delivery of content from supplying terminals to mobile terminals over a plurality of wireless local area networks reduces the load on the global wireless network, which has usually a much lower
5 bandwidth than those local networks and is more prone to transmission errors and to congestion.

A mobile terminal according to the invention can be used by a customer to find out the nature of electronic data available on a nearby supplying terminal, to select the
10 electronic data and to download it to the mobile terminal. The mobile terminal can also be used in paying for the electronic data. All that is required for the customer to be able to carry out such a transaction is that he must be within the operational range of the supplying terminal. In the case of a system operating according to Bluetooth this would be in the region of 10 meters. The customer does not need to
15 enter in physical contact with the supplying terminal; in fact, he does not even need to be able to see it. Hence, the supplying terminal need not be placed in an accessible location. Such a location may be at a premium in cramped points-of-sale such as kiosks, and so queues of customers at the supplying terminal can be avoided. Consequently, the invention can provide a space saving.

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The invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 shows a system for electronic delivery of content;

Figure 2 shows a vending machine;

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Figure 3 shows a mobile terminal;

Figure 4 shows lists presented on a POS terminal during selection;

Figure 5 shows lists presented on a POS terminal during an allocation check;

Figure 6 shows lists presented on a POS terminal during configuration; and

Figure 7 shows lists presented on a mobile terminal during selection of content.

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Figure 1 shows a system 10 for delivery of electronic content. The system comprises a vending machine 12, mobile terminals 14, generally carried by users, a point-of-sale (POS) terminal 16, and content servers 18 and 20. The vending

machine 12 communicates with the mobile terminals 14 over a local network 22. The vending machine 12 and the mobile terminals are all WAP-enabled and can communicate by WAP over Bluetooth or any other suitable wireless local communication channel. Bluetooth is a computing and telecommunications 5 industry specification that describes a means of providing a short range connection enabling mobile telephones, computers, and personal digital assistants to be interconnected with each other and with home and business telephones and computers using a short-range wireless connection. Each Bluetooth device needs to be equipped with a transceiver, typically in the form of a microchip, that 10 transmits and receives in an available frequency band. A band in the region of 2.45 GHz is available globally (with some variation of bandwidth in various countries).

In this embodiment the mobile terminals 14 are mobile telephones. They are each 15 provided with a WAP browser so that the users are able to control communication between the mobile terminals 14 and the vending machine 12. The vending machine 12 behaves towards the mobile terminals 14 as a WAP server.

The vending machine 12 communicates with the content servers 18 and 20 20 wirelessly. In the case of the content server 18 the communication occurs directly over a GSM network 24. Of course, in other embodiments, the network may be any wide-area cellular network. The vending machine 12 and the content server 18 communicate by using WAP requests. In the case of the content server 20 the communication occurs indirectly via a WAP gateway 26. The WAP gateway is 25 usually under the control of a telecommunications operator, typically the operator which runs the GSM network 24. The WAP gateway 26 converts requests in WAP format (essentially an encoded form of HyperText Transfer Protocol (HTTP)) carried over the Wireless Session Protocol (WSP) and the other underlying WAP protocols, into HyperText Transfer Protocol (HTTP) carried over TCP-IP. This is in 30 order that the requests from the vending machine may be dealt with by the content server 20.

The vending machine 12 can serve several content providers by supplying content obtained from different content servers. As will be explained in the following, the owner or controller of the vending machine 12, such as a merchant, can allocate more or less vending space to each provider, that is memory space to store content from a particular content provider. The providers can price the availability of their content depending on its popularity or the resources it requires to be stored on a vending machine. The merchant can also determine the price at which he sells the content.

10 The content servers 18 and 20 are managed and controlled by content providers. These content servers store a master copy of the content and are able to upload the vending machine 12 with content in a secure way as will be described in the following. In addition, they are able to communicate with the vending machine 12 and to request information concerning sales statistics of content provided by them.

15 The vending machine 12 is provided with a certificate to certify that it is authorised to receive content from the content server 18 and either content server 20 or WAP gateway 26 or both. The content servers 18 and 20 and the WAP gateway 26 may also each be provided with individual authentication certificates so that the vending machine 12 can establish that it is dealing with a legitimate provider and telecommunications operator.

20 It should be understood that although only one vending machine 12 has been shown, the system would in fact comprise a number of vending machines 12 each creating a local network within which nearby mobile terminals 14 can communicate with a respective vending machine.

25 Figure 2 shows an embodiment of a vending machine 12. The vending machine 12 comprises a central processing unit (CPU) 30, a GSM transceiver 32, a Bluetooth transceiver 34 and a memory 36. The memory 36 comprises memory for content 38, memory for sales statistics relating to products which have been supplied by various content providers 40, memory for the configuration of the vending machine and a catalogue of content 42, memory for content providers and

their addresses 44 and memory for transaction information (relating both to past and present transactions) 46. The vending machine also comprises a management module 48 for controlling configuration of the vending machine, certification means 50 for storing and using the certificate of the vending machine 12 and a transmission module 52 for controlling the receiving of content by the GSM transceiver 32, storing it in the content memory 38 and transmitting it to a mobile terminal via the transceiver 34. The CPU 30 controls the operation of the other elements. The function of these elements and their interrelations will be described below.

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Figure 3 shows an embodiment of a mobile terminal 14. The mobile terminal 14 comprises a central processing unit (CPU) 60, a GSM transceiver 62, a Bluetooth transceiver 64, a memory 66 for storing content, a WAP micro-browser and associated protocols 68 to control the transfer of data over the GSM transceiver 62

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and the Bluetooth transceiver 64, a display 70 and a memory 72 for telephony related functions of the mobile terminal. The operation of the GSM transceiver 62 in making telephone calls is not described since this relates to conventional telephony activity of the mobile terminal 14. The CPU 60 controls the operation of the other elements. The function of these elements and their interrelations will be

20

explained below.

Operation of the system will now be described. In the following, the operation is set out in four stages:

- (i) configuration of the vending machine;
- (ii) uploading the vending machine with content;
- (iii) selecting content in the vending machine; and
- (iv) downloading the content and paying for it.

The following description of the operation of the system and its various elements is described with particular embodiments of menus, selection lists and command sets as they could appear on a POS terminal or a mobile terminal. The menus, selection lists and commands sets are presented in Figures 4, 5, 6 and 7. The scope of the invention is not limited to the embodiments described with reference

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to these Figures, since they simply serve to illustrate one embodiment of the invention.

The first stage is configuring the vending machine 12. The management module 5 48 is activated during configuration of the vending machine 12. The POS terminal 16 is used for configuration. It is a WAP-enabled terminal configured to communicate with the vending machine 12 over a Bluetooth local network. Typically, the POS terminal 16 is under the control of the merchant who uses it in order to determine the content stored in the vending machine 12. Therefore, the 10 POS terminal 16 may be small and, since it communicates wirelessly, it does not need cabling at the point-of-sales to enable it to communicate with the vending machine 12. Although it may be portable, it does not need to be and may comprise a cash register.

15 The merchant operates the POS terminal 16 to obtain access to its main menu. In this particular embodiment, the main menu is in the form of a WAP browser with a pre-defined initial deck. The merchant selects an item "management" from this initial deck, and the POS terminal automatically establishes a connection to a well-known service access point of the vending machine. The vending machine 12 uses the Bluetooth transceiver 34 to establish this connection. The addressing 20 information that the POS terminal relies upon to connect to the vending machine is known and may, for example, have been set before the vending machine 12 and the terminal 14 were put into use.

25 Figure 4 shows menus, selection lists and forms presented on a POS terminal during configuration of the vending machine. On the POS terminal 16, after selecting "management", and obtaining access to a management selection list, the merchant selects the item "providers" and then, using a stored address list, selects a particular provider. Once a desired provider has been selected, details are 30 entered into a "server look-up" form to enable a connection to be established between the vending machine and the provider. To establish a connection with the server of a particular content provider, the merchant selects a command "connect".

The connection can occur directly if the merchant enters the address of the server. Alternatively, the content server can be accessed indirectly, via the gateway 26, if the merchant enters the address of the gateway. The addresses of content servers and of the gateway may be stored in the memory 44 of the vending machine, so that instead of entering these addresses each time, the merchant may just select an address from the list of stored addresses.

5 The vending machine uses the GSM transceiver 32 to establish a secure connection at a well-known IP port with the content server or with the WAP gateway 26. In embodiments in which communication between the vending machine and server or the gateway is by WAP, security of a session is provided by the Wireless Session Protocol (WSP) and the Wireless Transport Layer Security (WTLS). The certificate of the content server 18 or the WAP gateway 26 is used for authentication so that the vending machine 12 can determine that it is dealing 10 with a legitimate provider or telecommunications operator. The certification means that 15 of the vending machine 12 enables the content server and the telecom operator to determine that they are dealing with a legitimate merchant. The certification and authentication features are both provided by WTLS. Certification is used to protect the vending machine 12 from unauthorised content providers trying to fill it with 20 their own content to the detriment of legitimate content providers. It is also used to protect legitimate content providers from unauthorised merchants trying to illicitly obtain interesting content to sell.

25 Figure 5 shows the selection lists and status screens involved when the merchant uses the WAP browser of the POS terminal 16 to browse the catalogue of the content provider contained within either the content server 18 or the content server 20. The catalogue is stored in the content server 18 or content server 20 and has a known Uniform Resource Locator (URL). This URL has been advertised or otherwise made available by the content provider. When the vending machine and 30 the content server are connected and access has been authorised, the catalogue of the server is sent to the vending machine 12, either directly by the content server 18 or indirectly via the operator's WAP gateway 26. The vending machine

12 then forwards the information to the POS terminal 16. In this arrangement the vending machine 12 is acting as a proxy for the POS terminal 16.

If the merchant is interested by particular content offered in the catalogue of a

5 content provider, he can select the items of interest and obtain further details. This can conveniently be done if the catalogue allows those items to be indicated. By activating a command such as "save", information on the selected items can then be saved in the configuration and catalogue memory 42. If no items are indicated and the "save" command is selected, no items will be saved and the POS terminal

10 display will revert back to the management selection list. If it is not permitted for the merchant to select and store his selection directly from the catalogue, the merchant can rely upon the allocation step described below to allocate (that is save in the vending machine) the items of interest.

15 A further selection available from the management selection list is "configuration". The merchant may choose the item "status" from the "configuration" selection list, and the vending machine uses the management module 48 to present to the merchant a list of providers and the status of allocations of a particular provider which are stored within the vending machine 12. In this situation the vending

20 machine 12 acts as a WAP server for the POS terminal 16.

The merchant can allocate some of the content memory 38 of the vending machine 12 for particular content. Figure 6 shows selection lists, forms and status screens presented whilst configuration of the vending machine is occurring. In the

25 "configuration" selection list, the merchant selects "allocation" and allocates space for a particular provider. This allocation includes identifying or inputting the address of the relevant content server together with the necessary parameters for the allocation. The necessary parameters may include an IP address, a dial-up number, a catalogue URL and the total space to be allocated. The merchant can

30 then allocate particular items by giving an item identification code, a price and a duration for which they are to be stored in the vending machine.

The vending machine 12 updates its catalogue status stored in the configuration and catalogue memory 42 and sends a request to the content server, informing it that it is ready to accept content from it and the conditions, particularly the duration of storage and the size of the content to be stored, which will apply. The content

5 server returns an acknowledgement. The secure session between the content server 18 (or the WAP gateway 26) and the vending machine 12 may be kept open for future communication. The vending machine 12 initialises the content memory 38 for the new content and also initialises the sales statistics memory 40.

10 Figure 6 also shows the selection list and status screen which are presented by the POS terminal whilst a merchant reviews information relating to pending transactions.

15 The second stage is uploading the vending machine 12 with content. Uploading can occur at a suitable time, such as at night, or outside peak selling hours, when the vending machine 12 is unlikely to be busy. The transmission module 52 in the vending machine 12 is activated and it retrieves the latest information on the allocation parameters (which may have been modified by the merchant) from the configuration and catalogue memory 42. The vending machine 12 then uses the

20 GSM transceiver 32 to send a request requesting specific content to the content server. This request may be carried out via the WSP request POST. The vending machine 12 may also retrieve information from the sales statistics memory 40, and send it to relevant content providers. This information may be sent in response to a request by a content provider.

25 The content server sends to the vending machine 12 a catalogue of content which is to be uploaded on the vending machine 12. This catalogue may include information particular to each discrete item of content such as a product identifier, a short description, a price, a size and a margin for the merchant. The catalogue is

30 stored in the configuration and catalogue memory 42. The configuration and catalogue memory 42 may be provided in the form of files, a small database, or any other suitable persistent data structure. Not all of the catalogue information

may be made available to a customer subsequently requesting data from the vending machine 12.

At another suitable time, which may be immediately after the catalogue information

5 has been transferred or may be later, the content server pushes each new content item individually to the vending machine 12 using the push facilities defined in WAP. If the time is not suitable for the vending machine 12, it can reject or abort the pushes with a suitable control primitive. The content server, informed by the abort, can then postpone the transfer of content items to a later time.

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The vending machine 12 receives each pushed item of content, checks whether it matches an entry in the catalogue stored in the configuration and catalogue memory 42, and stores it in the content memory 38 if there is sufficient memory space available. If there is not enough space, it aborts storing the item, possibly 15 informing the content server of the error. A time-stamp may be added to the relevant entry in the catalogue to identify when the associated content item was uploaded.

20 Once all of the new content items have been pushed to the vending machine 12 and acknowledged by it, communication between the content server and vending machine 12 ceases. Communication will re-commence when further content is requested from the content server or if the vending machine 12 makes a report.

25 The vending machine 12 stores different types of information. It stores content to be downloaded to consumer terminals, statistics on sales of content, configuration information on the content and the content providers serving the machine (particularly the addresses of the relevant content servers). It also stores information about on-going transactions with customers. The information about configuration and statistics can be transmitted by the vending machine 12 to 30 content servers either on demand by the content servers, or on the initiative of the vending machine 12.

The storage for electronic content in the vending machine can be a disk, a writeable CD, or a large flash memory.

Since the transfer of content occurs securely by using WAP, for example by

5 providing a secure implementation with WTLS, the communication link between the vending machine 12 and the content server (or WAP gateway 26) is secure and so it is difficult for an unauthorised third party to receive the content while it is being transmitted. This is especially important because the content is transmitted over an air interface.

10

It should be noted that although in the present embodiment, uploading is described as occurring at a time which does not immediately follow configuring. However, uploading can occur immediately after configuring.

15 The third stage is selection of content by a customer. This is initiated by the customer and carried out between the mobile terminal 14 (under the customer's control) and the vending machine 12. This will now be described with reference to Figure 7 which shows selection lists and a status screen presented on a mobile terminal during selection of content by the customer.

20

The customer is in the vicinity of the vending machine. He uses a menu of the WAP micro-browser 68 to select the item "offerings" from a main menu in order to identify a possible vending machine. The mobile terminal uses the Bluetooth transceiver 64 to communicate with the vending machine 12. The mobile terminal 25 acts as a WAP client.

30 Once the mobile terminal has ascertained the address of a nearby vending machine which is suitable for a transaction, the mobile terminal makes a connection to a well-known port and is then used to browse information about content stored in the vending machine. This typically involves sending the initial request for a master page of the catalogue. It is preferred for this to be a default URL. This may have been configured once or pre-configured before the mobile terminal was provided to the customer.

The vending machine 12 responds by sending to the mobile terminal 14 the content of its catalogue (which may include the details of products, prices and product descriptions). The WAP micro-browser 68 presents an "offerings" list

5 which the customer can use to check available items, to order items and to obtain a pending transaction identification code. This list is presented on the display 70 for the customer to review.

A selection list, "available items", can be selected which presents a catalogue for

10 the customer to review. Further details relating to specific catalogue items can then be obtained. Items of interest can be selected. A selection list, "order", can be obtained from the "offerings" list and a script, such as a WML script downloaded with the catalogue, is activated and computes the total price. The user can then return to the micro-browser and change the selection or can confirm the order.

15

The request is sent to the vending machine 12. The vending machine 12 stores the desired lists of items and the total price, assigns a transaction identifier to the request and sends the transaction identifier to the mobile terminal. The transaction identifier is displayed on the screen of the mobile terminal.

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The fourth stage is downloading the content and paying for it. Having made his selection and received the transaction identifier, the customer goes to pay. He may also pay for other items as well, for example physical articles which are being purchased at the same time. The payment location is conveniently in the same

25 location as the POS terminal 16 or nearby. The customer informs the merchant, or any other person responsible for the POS terminal 16 at the time of the payment, of the transaction identifier of the transaction which is pending for purchase of the electronic content. The customer may directly tell the merchant the transaction identifier, he may show the merchant the transaction identifier in the display of the

30 mobile terminal or it may be transmitted electronically to the POS terminal 16.

The POS terminal 16 is then used to finalise the payment and downloading procedure. The merchant selects the item "transaction" in the initial deck of the

POS terminal, a request for transaction information is sent to the vending machine, and the vending machine transmits back to the POS terminal 16 a list of pending transactions with their prices. The merchant is able to choose the relevant transaction from this list. The merchant checks the transaction identifier against

5 the relevant transaction, and selects a sub-menu "confirm" on the menu of the POS terminal 16. The "confirm" request is sent to the vending machine 12, which immediately starts pushing all the purchased content items to the customer's mobile terminal 14.

10 The POS terminal 16 communicates with the vending machine 12 as a WAP client over Bluetooth.

As well as information concerning current transactions, the vending machine 12 also transmits to the POS terminal 16 configuration information and statistics 15 about sales of content. This information can be retrieved by the merchant at any time by selecting appropriate items on the "management" menu which result in the sending of corresponding requests to the vending machine.

20 The present embodiment of the invention uses Bluetooth. Since this can transmit data at a rate of at least 700Kbps, all content can be downloaded during the time it takes for the last steps of payment to be carried out. Alternatively, the content can be transmitted to the mobile terminal 14 after payment has occurred. Since the communication between mobile terminal 14 and the vending machine 12 is secured (because WTLS is used), it would be difficult for an unauthorised third 25 party to download content for free on another mobile terminal just by being in the vicinity of a customer who is just paying for the content.

30 The merchant enters the price for the electronic content into the POS terminal or a cash register, typically by typing the price into the POS terminal or register although any suitable means of input may be used. The entering operation may include the prices of any other physical articles which have been purchased. The customer pays the total amount and leaves the location of the vending machine. The vending machine records the transaction in its record of purchase statistics.

The vending machine may then send a confirmation that the transaction has been dealt with by the merchant to the mobile terminal.

5 The vending machine communicates as a WAP client over GSM with the content server 18, with the content server 20 via gateway 26, as a WAP server over Bluetooth with the mobile terminals and as a WAP proxy with the POS terminal.

10 Additional functionality can be defined for the merchant to clear up information about transactions that have never been completed, and to retrieve sales statistics and calculate his margin. The settlement between merchant and content providers can be carried out by any traditional means.

15 The invention can also be applied in environments in which the vending machine is in a location without a merchant. An example of such an environment is a railway station. There might be a vending machine provided to sell a set of train timetables to travellers, for example in a waiting room. In this case, payment could be carried out as follows. When payment is requested, the customer enters on the keypad of the mobile terminal a suitable credit card number and PIN. The information is sent (securely) to the vending machine. The vending machine 20 connects to a relevant financial institution (via WAP over GSM), to check that it is acceptable for the transaction to proceed. If the transaction may proceed, a suitable amount may be debited from a customer's account. Of course, other payment methods can be used such as electronic cash or SET (Secure Electronic Transactions) in which the mobile terminal sends a digital code representing an 25 authorisation to debit an account.

30 The invention relies upon standard, open technologies to implement the vending machine and thus can be used with a variety of terminals and a variety of content providers. In this way the invention provides a system and a method having openness and flexibility. Accordingly, it is relatively cheap to implement.

The invention provides a way to distribute and sell electronic content, such as digital maps, games and electronic sound recordings, in a simple and efficient

way. The invention uses wireless communication to make an entirely virtual vending machine, in which content handling and payment occur in places which are independent from the exact location of the machine. However, it should be understood that although the content is originally obtained from locations remote 5 from the vending machines, that is the content servers 18 and 20, the mobile terminals obtain it directly from the vending machines where it is stored.

The invention provides a virtual or wireless vending machine which is able to download such content onto WAP-enabled terminals

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The invention avoids any need for there to be an explicit remote coupling between the vending machines and:
the provider of electronic information;
the customers; and
15 the person in charge of dealing with the payment.

This lack of explicit coupling means that the vending machines do not need to be under the control of a central server. Indeed, vending machines can retrieve content from a variety of servers, and potentially from any data server from any content provider. Furthermore, the customers do not need to know in advance the 20 addresses of all vending machines from which they want to retrieve content. Indeed, customers are able to access the content of any vending machine just by entering its vicinity. In addition, because the vending machines are not explicitly coupled to the person in charge of dealing with the payment, it is not essential for the system to require payments by electronic cash or SET, nor is it essential for 25 the system to have been set up to establish connections with banks or other financial institutions.

The invention has been described with the help of examples. It is obvious to a person skilled in the art that the invention is not restricted to details of 30 embodiments presented above, and that the invention can be implemented in other embodiments without deviating from the characteristics of the invention. For example, in the foregoing, transfer of content between the vending machine and the mobile terminals or the content providers is described as being according to

WAP. WAP should be sufficient for many electronic content types. It can use HTTP (HyperText Transfer Protocol) range requests and packet sizes of, for example up to 64kB for UDP-IP (User Datagram Protocol- Internet Protocol). An alternative embodiment may rely upon TCP-IP (Transmission Control Protocol- Internet Protocol) to transmit largest blocks of information in a transparent way. Although the invention is described using Bluetooth as a short-range wireless communication method, other methods can be used. Thus, the presented embodiments should be considered illustrative, but not restrictive. Hence, the possibilities of implementing and using the invention are only restricted by the enclosed patent claims. Equivalent implementations are also within the scope of the present invention.

Claims

1. A system (10) for supplying data in electronic form comprising a mobile terminal (14), a supplying terminal (12), a wireless network (24) and a wireless connection, the supplying terminal being able to obtain electronic data from at least one data server (18, 20) by communication over the wireless network, the supplying terminal being able to supply at least part of the electronic data to the mobile terminal by communication over the wireless connection.
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2. A system (10) according to claim 1 in which there is a plurality of data servers (18, 20) to supply electronic data to the supplying terminals.
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3. A system (10) according to claim 1 or claim 2 in which the supplying terminal (12) acts as a proxy between the mobile terminal (14) and the data server (18, 20).
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4. A system (10) according to any preceding claim in which transfer of electronic data between the at least one data server (18, 20) and the supplying terminal (12) is carried out securely.
- 20 5. A system (10) according to any preceding claim in which transfer of electronic data between the supplying terminal (12) and the mobile terminal (14) is carried out securely.
- 25 6. A system (10) according to any preceding claim in which the supplying terminal (12) is a vending machine which supplies electronic data in exchange for a monetary payment.
- 30 7. A system (10) according to claim 6 in which the supplying terminal (12) and mobile terminal (14) exchange information necessary to enable payment to be made for the electronic data supplied to the mobile terminal.

8. A system (10) according to any preceding claim in which the mobile terminal (14) and the supplying terminal (12) communicate by the Wireless Application Protocol (WAP).
- 5 9. A system (10) according to any preceding claim in which the wireless network (24) and the wireless connection operate using different carrier frequencies.
- 10 10. A system (10) according to claim 9 in which the wireless network (24) uses a carrier frequency which is lower than the carrier frequency of the wireless connection.
11. A system (10) according to any preceding claim in which the wireless network (24) is a cellular network.
- 15 12. A system (10) according to any preceding claim in which the wireless connection is a local network (22) forming a pico-cell.
13. A system (10) according to any preceding claim in which wireless network (24) obtains the data from a second network which is a wired network.
- 20 14. A system (10) according to any preceding claim in which the wireless network (24) obtains the data from the Internet via a gateway.
15. A system (10) according to any preceding claim in which the data transmitted to the mobile terminal (14) from the supplying terminal (12) is only part of the data transmitted to the supplying terminal by the or each data server (18, 20).
- 25 16. A system (10) according to claim 15 in which a user of the mobile terminal (14) determines the part of the data which is transmitted.
- 30 17. A system (10) according to any preceding claim in which the electronic data obtained from at least one data server (18, 20) is determined by a person controlling operation of the supplying terminal (12).

18. A system (10) according to claim 17 in which the configuration of electronic data within the supplying terminal (12) is determined by the person controlling operation of the supplying terminal.

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19. A system (10) according to any preceding claim in which the price at which the electronic data is sold is determined by a person controlling supply of that electronic data to mobile terminals (14).

10 20. A system (10) according to any preceding claim in which the mobile terminal (14) is a mobile telephone.

15 21. A system (10) according to any of claims 1 to 19 in which the mobile terminal (14) is selected from a group consisting of game playing devices, portable audio players, portable video players personal digital assistants and smart telephones.

20 22. A method for supplying data in electronic form comprising the steps of:
providing a mobile terminal (14);
providing a supplying terminal (12);
providing one or more data servers (18, 20);
providing a wireless network (24) for enabling data transfer between the supplying terminal and data servers;
providing a wireless connection for enabling data transfer between the mobile terminal and the supplying terminal;
25 the supplying terminal obtaining data from at least one data server by communication over the wireless network; and
the supplying terminal transmitting at least part of the data to the mobile terminal over the wireless connection.

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23. A supplying terminal (12) for supplying data in electronic form comprising first wireless communication means (32) for receiving data from at least one data server (18, 20) over a wireless network (24) and second wireless